(To be filled up by the candidate by blue/black ball point pen)

Roll No. ☐☐☐☐☐☐☐☐☐

Roll No. (Write the digits in words) ....

Serial No. of OMR Answer Sheet ....

Day and Date ....

(Signature of Invigilator)

INSTRUCTIONS TO CANDIDATES

(Use only blue/black ball-point pen in the space above and on both sides of the Answer Sheet)

1. Within 10 minutes of the issue of the Question Booklet, Please ensure that you have got the correct booklet and it contains all the pages in correct sequence and no page/question is missing. In case of faulty Question Booklet, Bring it to the notice of the Superintendent/Invigilators immediately to obtain a fesh Question Booklet.

2. Do not bring any loose paper, written or blank, inside the Examination Hall *except the Admit Card without its envelope.*

3. *A separate Answer Sheet is given. It should not be folded or mutilated. A second Answer Sheet shall not be provided.*

4. Write your Roll Number and Serial Number of the Answer Sheet by pen in the space provided above.

5. *On the front page of the Answer Sheet, write by pen your Roll Number in the space provided at the top, and by darkening the circles at the bottom. Also, wherever applicable, write the Question Booklet Number and the Set Number in appropriate places.*

6. *No overwriting is allowed in the entries of Roll No., Question Booklet No. and Set No. (if any) on OMR sheet and Roll No. and OMR sheet no. on the Queston Booklet.*

7. *Any change in the aforesaid entries is to be verified by the invigilator, otherwise it will be taken as unfair means.*

8. *This Booklet contains 40 multiple choice questions followed by 10 short answer questions. For each MCQ, you are to record the correct option on the Answer Sheet by darkening the appropriate circle in the corresponding row of the Answer Sheet, by pen as mentioned in the guidelines given on the first page of the Answer Sheet. For answering any five shbort Answer Questions use five Blank pages attached at the end of this Question Booklet.*

9. For each question, darken only one circle on the Answer Sheet. If you darken more than one circle or darken a circle partially, the answer will be treated as incorrect.

10. *Note that the answer once filled in ink cannot be changed. If you do not wish to attempt a question, leave all the circles in the corresponding row blank (such question will be awarded zero marks).*

11. For rough work, use the inner back pages of the title cover and the blank page at the end of this Booklet.

12. *Deposit both OMR Answer Sheet and Question Booklet at the end of the Test.*

13. You are not permitted to leave the Examination Hall until the end of the Test.

14. If a candidate attempts to use any form of unfair means, he/she shall be liable to such punishment as the University may determine and impose on him/her.

Total No. of Printed Pages : 16

1

ROUGH WORK
रफ़ कार्य

2 ·

Time : 2 Hours

समय : 2 घण्टे

Full Marks : 200

पूर्णांक : 200

Note: (1) This Question Booklet contains **40** Multiple Choice Questions followed by **10** Short Answer Questions.

इस प्रश्न पुस्तिका में **40** वस्तुनिष्ठ व **10** लघु उत्तरीय प्रश्न हैं ।

(2) Attempt as many MCQs as you can. Each MCQ carries **3 (Three)** marks. **1 (One)** mark will be deducted for each incorrect answer. **Zero** mark will be awarded for each unattempted question. If more than one alternative answers of MCQs seem to be approximate to the correct answer, choose the closest one.

अधिकाधिक वस्तुनिष्ठ प्रश्नों को हल करने का प्रयत्न करें । प्रत्येक वस्तुनिष्ठ प्रश्न **3 (तीन)** अंकों का है । प्रत्येक गलत उत्तर के लिए **1 (एक)** अंक काटा जायेगा । प्रत्येक अनुत्तरित प्रश्न का प्राप्तांक **शून्य** होगा । यदि वस्तुनिष्ठ प्रश्नों के एकाधिक वैकल्पिक उत्तर सही उत्तर के निकट प्रतीत हों, तो निकटतम सही उत्तर दें ।

(3) Answer only **5** Short Answer Questions. Each question carries **16 (Sixteen)** marks and should be answered in **150-200** words. Blank **5 (Five)** pages attached with this booklet shall only be used for the purpose. Answer each question on separate page, after writing Question No.

केवल **5 (पाँच)** लघुउत्तरीय प्रश्नों के उत्तर दें । प्रत्येक प्रश्न **16 (सोलह)** अंकों का है तथा उनका उत्तर **150-200** शब्दों के बीच होना चाहिए । इसके लिए इस पुस्तिका में लगे हुए सादे **5 (पाँच)** पृष्ठों का ही उपयोग आवश्यक है । प्रत्येक प्रश्न का उत्तर एक नए पृष्ठ से, प्रश्न संख्या लिखकर शुरू करें ।

01. Which one of the following is **not** a kharif crop ?
(1) Paddy   (2) Maize
(3) Mustard   (4) Arhar

02. Select the crop, which is used for green manuring :
(1) Daincha (sunhemp)   (2) Sugarcane
(3) Tobacco   (4) Onion

03. Panama wilt disease is found in :
(1) Papaya   (2) Mango
(3) Peach   (4) Banana

04. Osmotic expansion of a cell kept in water is chiefly regulated by :
(1) Ribosomes   (2) Mitochondria
(3) Plastids   (4) Vacuoles

05. Community Development Programme was started in :
(1) 1952   (2) 1965
(3) 1957   (4) 1960

06. Food grains have :
(1) Inelastic demand   (2) Elastic demand
(3) Perfectly elastic demand   (4) Perfectly inelastic demand

07. The disease "ricket" in animal is caused due to deficiency of :
(1) Vitamin A   (2) Vitamin B
(3) Vitamin C   (4) Vitamin D

08. For comparing the variability of the two series, which one of the following measures is used :
(1) Standard Deviation   (2) Mean Deviation
(3) Range   (4) Coefficient of Variation

09. Which one of the following is an anticoagulant :

    (1) Heparin   (2) Interleukin

    (3) Plasmin   (4) Lymphokine

10. The fertility of soil is reduced by :

    (1) Alternate cropping   (2) Intensive cropping

    (3) Nitrogen fixing bacteria   (4) None of the above

11. The variance of first n natural numbers is :

    (1) $(n^2 + 1)/12$ (2) $(n + 1)^2/12$

    (3) $(n^2 - 1)/12$ (4) $(2n^2 - 1)/8$

12. De-Morgan's Law says :

    (1) $\overline{A \cap B} = \overline{A} \cup \overline{B}$ (2) $\left(\overline{\overline{A}}\right) = A$

    (3) $A - B = A \cap \overline{B}$ (4) $(A \cup B) \cup C = A \cup (B \cup C)$

13. If $X \sim \exp(5)$, the probability density function of X is :

    (1) $5 \exp(-5x)$ for $x > 0$ (2) $5 \exp(-x)$ for $x > 0$

    (3) $\exp(-5x)$ for $x > 0$ (4) $1/5 \exp(-5x)$ for $x > 0$

14. If $X \sim N(0, 1)$ and $Y \sim X^2/n$, the distribution of the variate $x/\sqrt{y}$ follows :

    (1) Cauchy's distribution   (2) Fisher's t-distribution

    (3) Student's t-distribution   (4) Gamma distribution

15. Factorization theorem for sufficiency is known as :

    (1) Rao-Black well theorem   (2) Crammer-Rao inequality

    (3) Chapman-Robins theorem   (4) Fisher-Neyman theorem

16. Bacterial clustering or contagion leads to :

    (1) Binomial distribution

    (2) Negative Binomial distribution

    (3) Polya's distribution

    (4) Poisson distribution

17. In the usual notations, $R^2_{1.23}$ can be expressed as :

    (1) $R^2_{1.23} = 1 - \left(1 - r^2_{12}\right)\left(1 - r^2_{13.2}\right)$

    (2) $R^2_{1.23} = \left(1 - r_{12}\right)\left(1 - r_{13.2}\right)$

    (3) $R^2_{1.23} = \left(1 - r^2_{12}\right)\left(1 - r^2_{13.2}\right)$

    (4) $R^2_{1.23} = 1 - \left(1 - r^2_{12}\right)\left(1 - r_{13.2}\right)$

18. Reduction in the size of the test results into :

    (1) decrease in its power

    (2) increase in its power

    (3) no change in its power

    (4) decrease and increase both in its power

19. Sum of products of two standard normal variates is :

    (1) Hotelling T^2 (2) Wishort distribution

    (3) Multi variate normal   (4) X^2-distribution

20. In case of study of fishes in big lake, better sampling scheme is :

   (1)   SRSWOR   (2)   SRSWR

   (3)   Strati fied Random   (4)   Cluster

21. Given population of size N, if n units are deleted and n' units are added, then probability of selection of any unit at a specified draw is :

   (1) $\dfrac{1}{N+n'-n}$ (2) $\dfrac{1}{N+n-n'}$

   (3) $\dfrac{n}{N+n'-n}$ (4) $\dfrac{N_{cn}}{N+n'-n}$

22. The discrepancies between sample estimate and population parameter is termed as :

   (1)   human error   (2)   formula error

   (3)   non-sampling error   (4)   sampling error

23. Systematic sampling means :

   (1)   selection of n largest units

   (2)   selection of n middle units in a sequence

   (3)   selection of n contiguous units

   (4)   selection of n units situated at equal distances

24. The range of Kendall's rank correlation coefficient T is :

   (1)   0 to 1   (2)   0 to ∞

   (3) -1 to 1   (4) $-\infty$ to ∞

25. Which one is an ordered estimator ?

   (1)   H-T estimator   (2)   Des Raj estimator

   (3)   Murthy estimator   (4)   Neyman estimator

26. For the product estimator $\overline{y}_p$ to be more efficient than the sample mean $\overline{y}_n$, the condition is :

   (1) $\rho < \dfrac{1}{2} \dfrac{C_x}{C_y}$

   (2) $\rho < \dfrac{1}{2} \dfrac{C_y}{C_x}$

   (3) $\rho > \dfrac{1}{2} \dfrac{C_x}{C_y}$

   (4) $\rho > \dfrac{1}{2} \dfrac{C_y}{C_x}$

27. Efficiency of cluster sampling increases if :

   (1) $\overline{s}_b^2$ decreases

   (2) $\overline{s}_b^2$ increases

   (3) $\overline{s}_w^2$ increases

   (4) $\overline{s}_b^2$ decreases and $\overline{s}_w^2$ increases

28. The d.f. due to various sources of variation in ANOVA model should follow the :

   (1) Probabilistic law   (2) Multiplicative law

   (3) Additive law   (4) Exponential law

29. In mxm LSD, the error d.f. is equal to :

   (1) $(m - 1)(m + 1)$ (2) $m(m - 1)$

   (3) $(m - 1)(m - 2)$ (4) $m(m - 2)$

30. A set of parameters of BIBD is :

(1) v, b, r, λ

(2) v, b, k, λ

(3) v, b, r, k, λ

(4) $v, b, \lambda k$

31. In z^3 factorial experiment, the contrasts A, B and C are :

(1) Non orthogonal to each other

(2) Orthogonal to each other

(3) Linearly related to each other

(4) Exponentially related to each other

32. A progeny row trial is carried out in a sample :

(1) C R D

(2) R B D

(3) L S D

(4) Split Plot Design

33. Compact Family Block Design is analogous to :

(1) RC BD

(2) L S D

(3) Split Plot Design

(4) Strip Plot Design

34. In a 5×5 L S D with one missing value, the total of row, column and treatment having the missing value are 25, 40 and 35 respectively and the total of all the available information is 100. The estimate of the missing value is :

(1) 15

(2) 20

(3) 25

(4) 35

35. For Cauchy distribution, consistent estimator of the population mean is :

    (1)   sample mean

    (2)   sample median

    (3)   sample mean and median both

    (4)   neither sample mean nor sample median

36. Which of the following is a contrast ?

    (1) $3T_1 + T_2 - 3T_3 + T_4$ (2) $T_1 + 3T_2 - 3T_3 + T_4$

    (3) $-3T_1 - T_2 + T_3 + 3T_4$ (4) $T_1 + T_2 + T_3 - T_4$

37. If the interactions AB and BC are confounded with incomplete blocks in a 2^n factorial experiment, the automatically confounded effort is :

    (1) ABC   (2) AC

    (3) A   (4) C

38. In RBD, with 4 blocks and 5 treatments with one missing value, the error d.f. will be :

    (1) 12   (2) 11

    (3) 10   (4) 9

39. For percentiles, the total number of partition values are :

    (1) 10   (2) 59

    (3) 100   (4) 99

40. Which one of these is not used for statistical analysis ?

    (1) SAS   (2) SPSS

    (3) SPAR   (4) ORACLE

Short Answer Questions

Note : Attempt any **five** questions. Write answer in **150-200** words. Each question carries **16** marks. Answer each question on separate page, after writing Question Number.

01. Discuss in brief contrasts and orthogonal contrasts.

02. State Neyman-Pearson Lemma and give its utility.

03. Discuss in brief the Duncan's Multiple Range Test.

04. When is a classification called nested or hierarchical ?

05. (a) Give the advantages of Split Plot Design are Randomized Block Design.

(b) Explain in brief Principle Component Analysis ?

06. Discuss the general approach of Likelihood Ratio Test.

07. Give the concept of a Life table and write on what assumptions or factors is the construction of life table based ?

08. What is the difference between secular trend and cyclic variation in time series analysis ?

09. Give the formulae estimates of mean and variance in case of two-stage sampling.

10. Explain the factor reversal test in Index Number. Also write about the criteria of good index number.

Question No.
प्रश्न संख्या

Page for Short Answer
लघु उत्तरीय के लिए पृष्ठ

Question No.
प्रश्न संख्या

Page for Short Answer
लघु उत्तरीय के लिए पृष्ठ

P.T.O.

Question No.
प्रश्न संख्या

Page for Short Answer
लघु उत्तरीय के लिए पृष्ठ

Question No.   **Page for Short Answer**
प्रश्न संख्या   लघु उत्तरीय के लिए पृष्ठ

अभ्यर्थियों के लिए निर्देश

(इस पुस्तिका के प्रथम आवरण पृष्ठ पर तथा उत्तर-पत्र के दोनों पृष्ठों पर केवल नीली-काली बाल-प्वाइंट पेन से ही लिखे)

1. प्रश्न पुस्तिका मिलने के 10 मिनट के अन्दर ही देख लें कि प्रश्नपत्र में सभी पृष्ठ मौजूद हैं और कोई प्रश्न छूटा नहीं है। पुस्तिका दोषयुक्त पाये जाने पर इसकी सूचना तत्काल कक्ष-निरीक्षक को देकर सम्पूर्ण प्रश्नपत्र की दूसरी पुस्तिका प्राप्त कर लें।

2. परीक्षा भवन में *लिफाफा रहित प्रवेश-पत्र के अतिरिक्त,* लिखा या सादा कोई भी खुला कागज साथ में न लायें।

3. *उत्तर-पत्र अलग से दिया गया है। इसे न तो मोड़ें और न ही विकृत करें। दूसरा उत्तर-पत्र नहीं दिया जावेगा। केवल उत्तर-पत्र का ही मूल्यांकन किया जावेगा।*

4. अपना अनुक्रमांक तथा उत्तर-पत्र का क्रमांक प्रथम आवरण-पृष्ठ पर पेन से निर्धारित स्थान पर लिखें।

5. उत्तर-पत्र के प्रथम पृष्ठ पर पेन से अपना अनुक्रमांक निर्धारित स्थान पर लिखें तथा नीचे दिये वृत्तों को गाढ़ा कर दें। जहाँ-जहाँ आवश्यक हो वहाँ प्रश्न-पुस्तिका का क्रमांक तथा सेट का नम्बर उचित स्थानों पर लिखें।

6. ओ० एम० आर० पत्र पर अनुक्रमांक संख्या, प्रश्नपुस्तिका संख्या व सेट संख्या (यदि कोई हो) तथा प्रश्नपुस्तिका पर अनुक्रमांक और ओ० एम० आर० पत्र संख्या की प्रविष्टियों में उपरिलेखन की अनुमति नहीं है।

7. उपर्युक्त प्रविष्टियों में कोई भी परिवर्तन कक्ष निरीक्षक द्वारा प्रमाणित होना चाहिये अन्यथा वह एक अनुचित साधन का प्रयोग माना जावेगा।

8. प्रश्न-पुस्तिका में प्रत्येक प्रश्न के चार वैकल्पिक उत्तर दिये गये हैं। प्रत्येक प्रश्न के वैकल्पिक उत्तर के लिए आपको उत्तर-पत्र की सम्बन्धित पंक्ति के सामने दिये गये वृत को उत्तर-पत्र के प्रथम पृष्ठ पर दिये गये निर्देशों के अनुसार पेन से गाढ़ा करना है।

9. प्रत्येक प्रश्न के उत्तर के लिए केवल एक ही वृत को गाढ़ा करें। एक से अधिक वृत्तों को गाढ़ा करने पर अथवा एक वृत को अपूर्ण भरने पर वह उत्तर गलत माना जायेगा।

10. ध्यान दें कि एक बार स्याही द्वारा अंकित उत्तर बदला नहीं जा सकता है। यदि आप किसी प्रश्न का उत्तर नहीं देना चाहते हैं, तो संबंधित पंक्ति के सामने दिये गये सभी वृत्तों को खाली छोड़ दें। ऐसे प्रश्नों पर शून्य अंक दिये जायेंगे।

11. रफ कार्य के लिए प्रश्न-पुस्तिका के मुखपृष्ठ के अंदर वाला पृष्ठ तथा उत्तर-पुस्तिका के अंतिम पृष्ठ का प्रयोग करें।

12. परीक्षा के उपरान्त केवल *ओ एम आर उत्तर-पत्र* परीक्षा भवन में जमा कर दें।

13. परीक्षा समाप्त होने से पहले परीक्षा भवन से बाहर जाने की अनुमति नहीं होगी।

14. यदि कोई अभ्यर्थी परीक्षा में अनुचित साधनों का प्रयोग करता है, तो वह विश्वविद्यालय द्वारा निर्धारित दंड का/की, भागी होगा/होगी।